IN THE CLAIMS:

Please amend the claims as follows:

1. (Original) A surface plasmon resonance sensor chip comprising:

a metal layer (3) along whose surface a surface plasmon wave can be induced by light irradiation; and

a plurality of diffraction grating surfaces (5a-5i, 251-254) that are disposed in the vicinity of said metal layer (3) and on each of which a diffraction grating with a uniform groove orientation and a uniform groove pitch is formed so as to generate an evanescent wave upon light irradiation;

wherein the groove pitch (d1-d4) and the groove orientation of each said diffraction grating surface (5a-5i, 251-254), in addition to the angle (αa-αi) that each said diffraction grating surface (5a-5i, 251-254) forms with a predetermined reference plane (S0), are adjusted in such a manner that when said diffraction grating surfaces (5a-5i, 251-254) are projected onto a predetermined projection plane, the groove orientations in the projection plane are identical while the groove pitches in the projection plane are different among said diffraction grating surfaces (5a-5i, 251-254).

2. (Original) A surface plasmon resonance sensor chip as defined in claim 1, wherein

each said diffraction grating surface (5a-5i) is disposed so as to be perpendicular to a specific plane (S1), which is perpendicular to the predetermined reference plane (S0), and as to form a predetermined inclination angle (αa-αi) with the reference plane (S0), and

on each said diffraction grating surface (5a-5i), the diffraction grating is formed in such a manner that the groove orientation is perpendicular to the specific plane (S1).

3. (Original) A surface plasmon resonance sensor chip as defined in claim 2, wherein said plural diffraction grating surfaces (5a-5i) are disposed along a line parallel to the specific plane (S1) in such a manner that when viewed from a direction parallel to the specific plane (S1), said plural diffraction grating surfaces (5a-5i) are positioned in decreasing order of the inclination angle (αa-αi) that each said diffraction grating surface (5a-5i) forms with the reference plane (S0).

4. (Currently Amended) A surface plasmon resonance sensor chip as defined in claim 2 ~~or 3~~, wherein said diffraction grating surfaces (5a-5i) are disposed continuously so as to form a convex shape whose light-irradiated side bulges out. |

5. (Original) A surface plasmon resonance sensor chip as defined in claim 4, wherein each said diffraction grating surface (25) has a minimum width with one groove alone, and the aggregate of said diffraction grating surfaces (25) forms a curved surface in an arc shape whose light-irradiated side bulges out.

6. (Currently Amended) A surface plasmon resonance sensor chip as defined in ~~one of~~ claims ~~2-5~~, wherein

each said diffraction grating surface (5a-5i) is formed along a sensor surface (1a), which comes in contact with a sample, and

on the sensor surface (1a), a binding substance (7) that binds specifically to a target species in the sample is immobilized for each said diffraction grating surface (5a-5i).

7. (Original) A surface plasmon resonance sensor chip as defined in claim 6, wherein two or more kinds of binding substances (7) are immobilized for each said diffraction grating surface (5a-5i).

8. (Currently Amended) A surface plasmon resonance sensor chip as defined in ~~one of~~ claims ~~2-7~~, further comprising a plurality of diffraction areas (6), within each of which said diffraction grating surfaces (5a-5i) are concentratedly disposed, wherein said plural diffraction grating surfaces (5a-5i) in each of said diffraction areas (6) have different inclination angles.

9. (Original) A surface plasmon resonance sensor chip as defined in claim 8, wherein

each said diffraction grating surface (5a-5i) is disposed along a sensor surface (1a), which comes in contact with a sample, and

on the sensor surface (1a), two or more binding substances (7) which each bind specifically to target species in the sample are immobilized so as to be associated with said diffraction areas (6).

10. (Currently Amended) A surface plasmon resonance sensor chip as defined in ~~one of~~ claims ~~6-9~~, further comprising a plurality of non-diffraction surfaces (37a-37i), which do not have any diffraction grating,

wherein each of said non-diffraction surfaces (37a-37i) is disposed along the sensor surface in the same plane with the respective one of said diffraction grating surfaces (35a-35i).

11. (Currently Amended) A surface plasmon resonance sensor chip as defined in ~~one of~~ claims ~~6-9~~, wherein each said diffraction grating surface has a reaction area, within which

the binding substance (47) is immobilized, and a non-reaction area, within which a substance (48) that does not bind specifically to any target species in the sample is immobilized or, alternatively, any substance is not immobilized.

12. (Currently Amended) A surface plasmon resonance sensor chip as defined in ~~one of~~ claims~~s~~ 6~~-9~~, wherein
said diffraction grating surfaces are arranged in a direction perpendicular to the groove orientation, and
said sensor chip further comprises
a cover (72) for covering the sensor surface (1a), and
a plurality of flow channels (70) formed side by side between the sensor surface (1a) and said cover (72) so as to pass along the direction in which said diffraction grating surfaces are arranged.

13. (Currently Amended) A surface plasmon resonance sensor chip as defined in claim 8 ~~or 9~~, further comprising a plurality of non-diffraction areas (88) associated one with each said diffraction area (87), each of said non-diffraction areas (88) having a plurality of non-diffraction surfaces concentratedly disposed therein, each of which non-diffraction surfaces does not have any diffraction grating,
wherein the inclination angles that said non-diffraction surfaces included in the non-diffraction area (88) form with the reference plane have the same distribution as the distribution of the inclination angles that said diffraction grating surfaces included in the associated diffraction area (87) form with the reference plane.

14. (Currently Amended) A surface plasmon resonance sensor chip as defined in claim 8 ~~or 9~~, wherein
each of one or more diffraction areas among said diffraction areas (96) has a reaction area, in which a binding substance (97) that binds specifically to a target species in the sample is immobilized, and
each of the remaining diffraction areas among said diffraction areas (96) has a non-reaction area, in which a substance (98) that does not bind specifically to any target species in the sample is immobilized or, alternatively, any substance is not immobilized.

15. (Currently Amended) A surface plasmon resonance sensor chip as defined in claim 8 ~~or 9~~, further comprising
a cover (102) for covering the sensor surface (1a), and
a plurality of flow channels (100) disposed side by side between the sensor surface (1a) and said cover (102),
wherein said diffraction areas (6) are disposed for each of said flow channels (100).

16. (Currently Amended) A method of quantitatively and/or qualitatively analyzing a sample using a surface

plasmon resonance sensor chip as defined in ~~one of~~ claims~~s~~ 6-~~9~~, comprising the steps of:

making the sample in contact with the sensor surface (1a) while irradiating the sensor surface (1a) with light in parallel to the specific plane (S1) at a predetermined incident angle;

receiving the light reflected from the sensor surface (1a) and measuring the intensity of the light reflected by each said diffraction grating surface (5a-5i);

calculating a resonance angle at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on both the measured intensity of the reflected light due to each said diffraction grating surface (5a-5i) and the inclination angle that each said diffraction grating surface (5a-5i) forms with the reference plane (S0); and

quantitatively and/or qualitatively analyzing the sample based on the calculated resonance angle.

17. (Currently Amended) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 10 ~~or 13~~, comprising the steps of:

making the sample in contact with the sensor surface while irradiating the sensor surface with light in parallel to the specific plane at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (35a-35i);

correcting the measured intensity of the reflected light due to each said diffraction grating surface (35a-35i) with consideration given to the intensity of the light reflected by each said non-diffraction surface (37a-37i);

calculating a resonance angle at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on both the corrected intensity of reflected light due to each said diffraction grating surface (35a-35i) and the inclination angle that each said diffraction grating surface (35a-35i) forms with the reference plane; and

quantitatively and/or qualitatively analyzing the sample based on the calculated resonance angle.

18. (Currently Amended) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 11 ~~or 14~~, comprising the steps of:

making the sample in contact with the sensor surface while irradiating the sensor surface with light in parallel to the specific plane at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface;

calculating, for each of the reaction area and the non-reaction area, a resonance angle at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on both the measured intensity of the reflected light due to each said diffraction grating surface and the inclination angle that each said diffraction grating surface forms with the reference plane; and

after correcting the resonance angle of the reaction area with consideration given to the resonance angle of the non-reaction area, quantitatively and/or qualitatively analyzing the sample based on the corrected resonance angle of the reaction area.

19. (Currently Amended) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 12 ~~or 15~~, comprising the steps of:

assigning a plurality of different samples to said plural flow channels (70), respectively, and letting each of the samples flow through the respective flow channel (70) while irradiating the sensor surface with light in parallel to the specific plane at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface;

calculating, for each sample flowing through the respective flow channel (70), a resonance angle at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on both the measured intensity of the reflected light due to each said diffraction grating surface and the inclination angle that each said diffraction grating surface forms with the reference plane; and

quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (70), based on the calculated resonance angle for each said flow channel (70).

20. (Currently Amended) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in ~~one of~~ claim 6~~-9~~, comprising the steps of:

making the sample in contact with the sensor surface (1a) while irradiating the sensor surface (1a) with light in parallel to the specific plane (S1) at a predetermined incident angle;

receiving the light reflected from the sensor surface (1a) and measuring the intensity of the light reflected by each said diffraction grating surface (5a-5i);

determining the variation between the measured intensity of the reflected light due to each said diffraction grating surface (5a-5i) and the intensity of the light reflected when any sample is not in contact with the sensor surface (S1); and

selecting a diffraction grating surface (5a-5i) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected diffraction grating surface (5a-5i).

21. (Currently Amended) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 10 ~~or 13~~, comprising the steps of:

making the sample in contact with the sensor surface while irradiating the sensor surface with light in parallel to the specific plane at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (35a-35i);

correcting the intensity of the reflected light due to each said diffraction grating surface (35a-35i) with consideration given to the intensity of the reflected light due to each said non-diffraction surface (37a-37i);

determining the variation between the corrected intensity of the reflected light due to each said diffraction grating surface (35a-35i) and the intensity of the light reflected when any sample is not in contact with the sensor surface; and

selecting a diffraction grating surface (35a-35i) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected diffraction grating surface (35a-35i).

22. (Currently Amended) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 11 ~~or 14~~, comprising the steps of:

making the sample in contact with the sensor surface while irradiating the sensor surface with light in parallel to the specific plane at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface;

determining, for each of the reaction area and the non-reaction area, the variation between the measured intensity of the reflected light due to each said diffraction grating surface and the intensity of the light reflected when any sample is not in contact with the sensor surface; and

selecting, for each of the reaction area and the non-reaction area, a diffraction grating surface whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and quantitatively and/or qualitatively analyzing the sample based on both the selected variation of the reflected-light intensity of the reaction area and the selected variation of the reflected-light intensity of the non-reaction area.

23. (Currently Amended) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 12 ~~or 15~~, comprising the steps of:

assigning a plurality of different samples to said plural flow channels (70), respectively, and letting each of the samples flow through the respective flow channel (70) while irradiating the sensor surface with light in parallel to the specific plane at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface;

determining the variation between the measured intensity of the reflected light due to each said diffraction grating surface and the intensity of the light reflected when any sample does not flow through each said flow channel (70); and

selecting, for each said flow channel (70), a diffraction grating surface whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (70), based on the variation of the reflected-light intensity of the diffraction grating surface selected for each said flow channel (70).

24. (Currently Amended) A method as defined in ~~one of~~ claim~~s~~ 16~~-23~~, further comprising the step of separating the sample by physical and/or chemical action prior to introducing the sample to the surface plasmon resonance sensor chip.

25. (Original) A method as defined in claim 24, wherein in said step of separating, the sample is separated by a separation technique using at least one of liquid chromatography, HPLC (high performance liquid chromatography), capillary electrophoresis, microchip electrophoresis, flow injection, and microchannel.

26. (Currently Amended) A method as defined in ~~one of~~ claim 16~~-25~~, wherein

the target species is a light-emitting substance,

said method further comprises the step of detecting the light emitted from the light-emitting substance that is bound to the binding substance prior to light-irradiating the sensor surface or, alternatively, after light-irradiating the sensor surface and receiving the reflected light, and

in said step of quantitatively and/or qualitatively analyzing, the sample is analyzed with consideration given to the detection result of the emitted light.

27. (Currently Amended) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in ~~one of~~ claim~~s~~ 6~~-9~~, comprising:

holding means (11) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (12) for irradiating the sensor surface (1a) with light in parallel to the specific plane (S1) at a predetermined incident angle in a state where the surface plasmon resonance sensor chip is held by said holding means (11);

light receiving means (13) for receiving the light reflected from the sensor surface (1a);

measuring means (13) for measuring the intensity of the light reflected by each said diffraction grating surface (1a) and received by said light receiving means (13);

calculating means (14) for calculating a resonance angle at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on both the intensity, measured by said measuring means (13), of the reflected light due to each said diffraction grating surface (1a) and the inclination angle that each said diffraction grating surface (1a) forms with the reference plane (S0); and

analyzing means for quantitatively and/or qualitatively analyzing the sample based on the resonance angle calculated by said calculating means (14).

28. (Currently Amended) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 10 ~~or 13~~, comprising:

holding means (11) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (12) for irradiating the sensor surface with light in parallel to the specific plane at a predetermined incident angle in a state where the surface plasmon resonance sensor chip is held by said holding means (11);

light receiving means (13) for receiving the light reflected from the sensor surface;

measuring means (13) for measuring the intensity of the light reflected by each said diffraction grating surface and received by said light receiving means (13);

correcting means (14) for correcting the intensity of reflected light due to each said diffraction grating surface (35a-35i) with consideration given to the intensity of the reflected light due to the non-diffraction surface (37a-37i);

calculating means (14) for calculating a resonance angle at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on both the intensity, corrected by said correcting means (14), of the reflected light due to each said diffraction grating surface (35a-35i) and the inclination angle that each said diffraction grating surface (35a-35i) forms with the reference plane; and

analyzing means for quantitatively and/or qualitatively analyzing the sample based on the resonance angle calculated by said calculating means (14).

29. (Currently Amended) An apparatus for quantitatively and/or qualitatively analyzing a sample using a

surface plasmon resonance sensor chip as defined in claim 11 ~~or 14~~, comprising:

holding means (11) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (12) for irradiating the sensor surface with light in parallel to the specific plane at a predetermined incident angle in a state where the surface plasmon resonance sensor chip is held by said holding means (11);

light receiving means (13) for receiving the light reflected from the sensor surface;

measuring means (13) for measuring the intensity of the light reflected by each said diffraction grating surface and received by said light receiving means (13);

calculating means (14) for calculating, for each of the reaction area and the non-reaction area, a resonance angle at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the intensity, measured by said measuring means (13), of the reflected light due to each said diffraction grating surface and the inclination angle that each said diffraction grating surface forms with the reference plane; and

analyzing means (14) for correcting the resonance angle, calculated by said calculating means (14), of the reaction area with consideration given to the resonance angle of the non-reaction area and for quantitatively and/or qualitatively analyzing the sample based on the corrected resonance angle of the reaction area,.

30. (Currently Amended) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 12 ~~or 15~~, comprising:

holding means (11) for holding the surface plasmon resonance sensor chip;

sample introducing means (79) for assigning a plurality of different samples to said plural flow channels (70), respectively, and for introducing each of the samples into the respective flow channel (70) in a state where the surface plasmon resonance sensor chip is held by said holding means (11);

light irradiating means (12) for irradiating the sensor surface with light in parallel to the specific plane at a predetermined incident angle in a state where each sample is introduced into the respective flow channel (70) by said sample introducing means (79);

light receiving means (13) for receiving the light reflected from the sensor surface;

measuring means (13) for measuring the intensity of the light reflected by each said diffraction grating surface and received by said light receiving means (13);

calculating means (14) for calculating a resonance angle at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs for each said flow channel (70), based on the intensity, measured by said measuring means (13), of the reflected light due to each said diffraction grating surface and the inclination angle that each said diffraction grating surface forms with the reference plane; and

analyzing means (14) for quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (70), based on the resonance angle calculated by said calculating means (14).

31. (Currently Amended) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in ~~one of~~ claim~~s~~ 6~~-9~~, comprising:

holding means (11) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (12) for irradiating the sensor surface with light in parallel to the specific plane at a predetermined incident angle in a state where the surface plasmon resonance sensor chip is held by said holding means (11);

light receiving means (13) for receiving the light reflected from the sensor surface;

measuring means (13) for measuring the intensity of the light reflected by each said diffraction grating surface (5a-5i) and received by said light receiving means (13);

determining means (14) for determining the variation between the intensity, measured by said measuring means (13), of the reflected light due to each said diffraction grating surface (5a-5i) and the intensity of the light reflected when any sample is not in contact with the sensor surface (1a);

analyzing means for selecting a diffraction grating surface (5a-5i) whose variation, determined by said determining means (14), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected diffraction grating surface (5a-5i).

32. (Currently Amended) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 10 ~~or 13~~, comprising:

holding means (11) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (12) for irradiating the sensor surface with light in parallel to the specific plane at a predetermined incident angle in a state where the surface plasmon resonance sensor chip is held by said holding means (11);

light receiving means (13) for receiving the light reflected from the sensor surface;

measuring means (13) for measuring the intensity of the light reflected by each said diffraction grating surface and received by said light receiving means (13);

correcting means (14) for correcting the intensity of reflected light due to each said diffraction grating surface (35a-35i) with consideration given to the intensity of the reflected light due to the non-diffraction surface (37a-37i);

determining means (14) for determining the variation between the intensity, corrected by said correcting means (14), of the reflected light due to each said diffraction grating surface (35a-35i) and the intensity of the light reflected when any sample is not in contact with the sensor surface; and

analyzing means (14) for selecting a diffraction grating surface (35a-35i) whose variation, determined by said determining means (14), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected diffraction grating surface (35a-35i).

33. (Currently Amended) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 11 ~~or 14~~, comprising:

holding means (11) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (12) for irradiating the sensor surface with light in parallel to the specific plane at a predetermined incident angle in a state where the surface plasmon resonance sensor chip is held by said holding means (11);

light receiving means (13) for receiving the light reflected from the sensor surface;

measuring means (13) for measuring the intensity of the light reflected by each said diffraction grating surface and received by said light receiving means (13);

determining means (14) for determining, for each of the reaction area and the non-reaction area, the variation between the intensity, measured by said measuring means (13), of the reflected light due to each said diffraction grating surface and the intensity of the light reflected when any sample is not in contact with the sensor surface; and

analyzing means (14) for selecting a diffraction grating surface whose variation, determined by said determining means (14), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing the sample based on both the variation of the reflected-light intensity of the selected reaction area and the variation of the reflected-light intensity of the selected non-reaction area.

34. (Currently Amended) An apparatus for quantitatively and/or qualitatively analyzing a sample using a

surface plasmon resonance sensor chip as defined in claim 12 ~~or 15~~, comprising:

holding means (11) for holding the surface plasmon resonance sensor chip;

sample introducing means (79) for assigning a plurality of different samples to the plural flow channels (70), respectively, and for introducing each of the samples into the respective flow channel (70) in a state where the surface plasmon resonance sensor chip is held by said holding means (11);

light irradiating means (12) for irradiating the sensor surface with light in a predetermined direction in a state where each sample is introduced into the respective flow channel (70) by said sample introducing means (79);

light receiving means (13) for receiving the light reflected from the sensor surface;

determining means (14) for determining the variation between the intensity of the light reflected by each said diffraction grating surface and received by said light receiving means (13) and the intensity of the light reflected when any sample is not flowing through each said flow channel (70); and

analyzing means (14) for selecting, for each said flow channel (70), a diffraction grating surface whose variation, determined by said determining means (14), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (70), based on the variation of the reflected-light intensity of the diffraction grating surface selected for each said flow channel (70).

35. (Currently Amended) An apparatus as defined in ~~one of~~ claim 27~~-34~~, further comprising sample separating means (59) for separating the sample by physical and/or chemical action prior to introducing the sample to the surface plasmon resonance sensor chip.

36. (Original) An apparatus as defined in claim 35, wherein said sample separating means (59) is operable to separate the sample by a separation technique using at least one of liquid chromatography, HPLC (high performance liquid chromatography), capillary electrophoresis, microchip electrophoresis, flow injection, and microchannel.

37. (Currently Amended) An apparatus as defined in ~~one of~~ claim 27~~-36~~, wherein

the target species is a light-emitting substance,

said light receiving means (13) is operable to detect the light emitted from the light-emitting substance that is bound to the binding substance, and

said analyzing means (14) is operable to quantitatively and/or qualitatively analyze the sample with consideration given to the detection result of the light emission by said light receiving means (13).

38. (Original) A surface plasmon resonance sensor chip as defined in claim 1, wherein

each said diffraction grating surface (251-254) is disposed so as to be parallel to a predetermined reference plane, and

on each said diffraction grating surface (251-254), the diffraction grating (205) is formed in such a manner that the groove orientations are identical while the groove pitches (d1-d4) are different among said diffraction grating surfaces (251-254).

39. (Cancel) A surface plasmon resonance sensor chip as defined in claim 38, wherein

each said diffraction grating surface (251-254) is formed along a sensor surface (201a), which comes in contact with a sample, and

on the sensor surface (201a), a binding substance (206) that binds specifically to a target species in the sample is immobilized for each said diffraction grating surface (251-254).

40. (Cancel) A surface plasmon resonance sensor chip as defined in claim 39, wherein two or more kinds of binding substances (206, 207) are immobilized for each said diffraction grating surface (251-254).

41. (Cancel) A surface plasmon resonance sensor chip as defined in claim 49 or 40, further comprising a plurality of non-diffraction surfaces (251x-254x), each of which does not have any diffraction grating,

wherein each of said non-diffraction surfaces (251x-254x) is disposed along the sensor surface (261a) in the same plane with the respective one of said diffraction grating surfaces (251-254).

42. (Cancel) A surface plasmon resonance sensor chip as defined in claim 39 or 40, wherein each said diffraction grating surface (251-254) has a reaction area, within which the binding substance (206) is immobilized, and a non-reaction area, within which a substance (291) that does not bind specifically to any target species in the sample is immobilized or, alternatively, any substance is not immobilized.

43. (Cancel) A surface plasmon resonance sensor chip as defined in claim 39 or 40, wherein

said diffraction grating surfaces (251-254) are arranged in a direction perpendicular to the groove orientation, and

said sensor chip further comprises

a cover (286) for covering the sensor surface (281a), and

a plurality of flow channels (280) formed side by side between the sensor surface (281a) and said cover (286) so as to pass along the direction in which said diffraction grating surfaces (281a) are arranged.

44. (Cancel) A surface plasmon resonance sensor chip as defined in claim 39 or 40, wherein:

said diffraction grating surfaces (251-254) are arranged in a direction perpendicular to the groove orientation;

said sensor chip further comprises

a cover (286) for covering the sensor surface (281a), and

a plurality of flow channels (280) formed side by side between the sensor surface (281a) and said cover (286) so as to pass along the direction in which said diffraction grating surfaces (251-254) are arranged; and

along each of said flow channels (280), each said diffraction grating surface (251-254) has a reaction area, within which the binding substance (206) is immobilized, and a non-reaction area, within which a substance (291) that does not bind specifically to any target species in the sample is immobilized or, alternatively, any substance is not immobilized.

45. (Cancel) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 39 or 40, comprising the steps of:

making the sample in contact with the sensor surface (201a) while irradiating the sensor surface (201a) with light at a predetermined incident angle;

receiving the light reflected from the sensor surface (201a) and measuring the intensity of the light reflected by each said diffraction grating surface;

identifying a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the measured intensity of the reflected light due to each said diffraction grating surface (201a); and

quantitatively and/or qualitatively analyzing the sample based on the identified groove pitch.

46. (Cancel) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 41, comprising the steps of:

making the sample in contact with the sensor surface while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

correcting the intensity of the reflected light due to each said diffraction grating surface (251-254) with consideration given to the intensity of the light reflected by the respective non-diffraction surface (251x-254x);

identifying a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the corrected intensity of the reflected light due to each said diffraction grating surface (251-254); and

quantitatively and/or qualitatively analyzing the sample based on the identified groove pitch.

47. (Cancel) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 42, comprising the steps of:

making the sample in contact with the sensor surface while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

identifying, for each of the reaction area and the non-reaction area, a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the measured intensity of the reflected light due to each said diffraction grating surface (251-254); and

quantitatively and/or qualitatively analyzing the sample based on the groove pitch identified for each of the reaction area and the non-reaction area.

48. (Cancel) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 43, comprising the steps of:

assigning a plurality of different samples to said plural flow channels (280), respectively, and letting each of the samples flow through the respective flow channel (280) while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

identifying, for each said flow channel (280), a groove pitch at which the resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the measured intensity of the reflected light due to each said diffraction grating surface (251-254); and

quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the groove pitch identified for each said flow channel (280).

49. (Cancel) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 44, comprising the steps of:

assigning a plurality of different samples to said plural flow channels (280), respectively, and letting each of the samples flow through the respective flow channel (280) while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

identifying, for each said flow channel (280) and for each of the reaction area and the non-reaction area, a groove pitch at which the resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the measured intensity of the reflected light due to each said diffraction grating surface (251-254); and

quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the groove pitch identified for each said flow channel (280) and for each of the reaction area and the non-reaction area.

50. (Cancel) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as define in claim 39 or 40, comprising the steps of:

making the sample in contact with the sensor surface (201a) while irradiating the sensor surface (201a) with light at a predetermined incident angle;

receiving the light reflected from the sensor surface (201a) and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

determining the variation between the measured intensity of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface (201a); and

selecting a diffraction grating surface (251-254) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected diffraction grating surface (251-254).

51. (Cancel) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 41, comprising the steps of:

making the sample in contact with the sensor surface while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

correcting the intensity of the reflected light due to each said diffraction grating surface (251-254) with consideration given to the intensity of the light reflected by the respective non-diffraction surface (251x-254x);

determining the variation between the corrected intensity of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface; and

selecting a diffraction grating surface (251-254) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected diffraction grating surface.

52. (Cancel) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 42, comprising the steps of:

making the sample in contact with the sensor surface while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

determining, for each of the reaction area and the non-reaction area, the variation between the measured intensity of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface;

selecting, for each of the reaction area and the non-reaction area, a diffraction grating surface (251-254) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected reaction area and the variation of the reflected-light intensity of the selected non-reaction area.

53. (Cancel) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 43, comprising the steps of:

assigning a plurality of different samples to said plural flow channels (280), respectively, and letting each of the samples flow through the respective flow channel (280) while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

determining the variation between the measured intensity of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample does not flow through each said flow channel (280);

selecting, for each said flow channels (280), a diffraction grating surface (251-254) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the variation of the reflected-light intensity of the selected diffraction grating surface (251-254) for each said flow channels (280).

54. (Cancel) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 44, comprising the steps of:

assigning a plurality of different samples to said plural flow channels (280), respectively, and letting each of the samples flow through the respective flow channel (280) while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

determining, for each of the reaction area and the non-reaction area, the variation between the measured intensity of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample does not flow through each said flow channel (280);

selecting, for each of the flow channels (280) and for each of the reaction area and the non-reaction area, a diffraction grating surface (251-254) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the variation of the reflected-light intensity of the selected reaction area and the variation of the reflected-light intensity of the selected non-reaction area.

55. (Cancel) A method as defined in one of claims 45-54, wherein it further comprises the step of separating the sample by physical and/or chemical action prior to introducing the sample to the surface plasmon resonance sensor chip.

56. (Cancel) A method as defined in claim 55, wherein in said step of separating, the sample is separated by a separation technique using at least one of liquid chromatography, HPLC (high performance liquid chromatography), capillary electrophoresis, microchip electrophoresis, flow injection, and microchannel.

57. (Cancel) A method as defined in one of claims 45-56, wherein

the target species is a light-emitting substance,

said method further comprises the step of detecting the light emitted from the light-emitting substance that is bound to the binding substance prior to light-irradiating the sensor surface or, alternatively, after light-irradiating the sensor surface and receiving the reflected light, and

in said step of quantitatively and/or qualitatively analyzing, the sample is analyzed with consideration given to the detection result of the light emission.

58. (Cancel) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 39 or 40, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface (201a) being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface (201a) with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213); and

analyzing means (214) for identifying a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254), and for quantitatively and/or qualitatively analyzing the sample based on the identified groove pitch.

59. (Cancel) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as define in claim 41, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213); and

correcting means (214) for correcting the intensity of the reflected light due to each said diffraction grating surface (251-254) with consideration given to the intensity of the reflected light due to the respective non-diffraction surface (251x-254x); and

analyzing means (214) for identifying a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the intensity, corrected by said correcting means (214), of the reflected light due to each said diffraction grating surface (251-254), and for quantitatively and/or qualitatively analyzing the sample based on the identified groove pitch.

60. (Cancel) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 42, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213); and

analyzing means (214) for identifying, for each of the reaction area and the non-reaction area, a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254), and for quantitatively and/or qualitatively analyzing the sample based on the groove pitch identified for each of the reaction area and the non-reaction area.

61. (Cancel) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 43, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip;

sample introducing means (282) for assigning a plurality of different samples to said plural flow channels (280), respectively, and for introducing each of the plural samples into the respective flow channel (280) in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where each sample is introduced into the respective flow channel (282) by said sample introducing means (282);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

analyzing means for identifying, for each said flow channel (280), a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254), and for quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the groove pitch identified for each said flow channel (280).

62. (Cancel) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 44, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip;

sample introducing means (282) for assigning a plurality of different samples to said plural flow channels (280), respectively, and for introducing each sample into the respective flow channel (280) in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where each sample is introduced into the respective flow channel (280) by said sample introducing means (282);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

analyzing means for identifying, for each said flow channel (280) and for each of the reaction area and the non-reaction area, a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254), and for quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the groove pitches of the reaction area and the non-reaction area identified for each said flow channel (280).

63. (Cancel) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 39 or 40, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface (201a) being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

determining means (214) for determining the variation between the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface (201a); and

analyzing means (214) for selecting a diffraction grating surface (251-254) whose variation, determined by said determining means (214), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected diffraction grating surface (251-254).

64. (Cancel) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 41, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

correcting means (214) for correcting the intensity of the reflected light due to each said diffraction grating surface (251-254) with consideration given to the intensity of the reflected light due to the respective non-diffraction surface (251x-254x);

determining means (214) for determining the variation between the intensity, corrected by said correcting means (214), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface;

analyzing means (214) for selecting a diffraction grating surface (251-254) whose variation, determined by said determining means (214), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected diffraction grating surface (251-254).

65. (Cancel) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 42, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

determining means (214) for determining, for each of the reaction area and the non-reaction area, the variation between the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface; and

analyzing means (214) for selecting, for each of the reaction area and the non-reaction area, a diffraction grating surface (251-254) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected reaction area and the variation of the reflected-light intensity of the selected non-reaction area.

66. (Cancel) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 43, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip;

sample introducing means (282) for assigning a plurality of different samples to said plural flow channels (280), respectively, and for introducing each of the plural samples into the respective flow channel (280) in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where each sample is introduced into the respective flow channel (280) by said sample introducing means (282);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

determining means (214) for determining the variation between the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample does not flow through each said flow channel (280); and

analyzing means for selecting, for each said flow channel (280), a diffraction grating surface (251-254) whose variation, determined by said determining means (214), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280) based on the variation of the reflected-light intensity of the diffraction grating surface (251-254) selected for each said flow channel (280).

67. (Cancel) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 44, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip;

sample introducing means (282) for assigning a plurality of different samples to said plural flow channels (280), respectively, and for introducing each of the plural samples into the respective flow channel (280) in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where each sample is introduced into the respective flow channel (280) by said sample introducing means (282);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

determining means (214) for determining, for each of the reaction area and the non-reaction area, the variation between the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample does not flow through each said flow channel (213); and

analyzing means (214) for selecting, for each said flow channel (280) and for each of the reaction area and the non-reaction area, a diffraction grating surface (251-254) whose variation, determined by said determining means (214), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the variation of the reflected-light intensity of the selected reaction area and the variation of the reflected-light intensity of the selected non-reaction area for each said flow channel (280).

68. (Cancel) An apparatus as defined in one of claims 58-67, wherein it further comprises sample separating means (292) for separating the sample by physical and/or chemical

action prior to introducing the sample to the surface plasmon resonance sensor chip.

69. (Cancel) An apparatus as defined in claim 68, wherein said sample separating means (292) is operable to separate the sample by a separation technique using at least one of liquid chromatography, HPLC (high performance liquid chromatography), capillary electrophoresis, microchip electrophoresis, flow injection, and microchannel.

70. (Cancel) An apparatus as defined in one of claims 58-69, wherein

the target species is a light-emitting substance,

said light receiving means (213) is operable to detect the light emitted from the light-emitting substance that is bound to the binding substance, and

said analyzing means (214) is operable to quantitatively and/or qualitatively analyze the sample with consideration given to the detection result of the light emission by said light receiving means (213).

71. (Cancel) A surface plasmon resonance sensor chip comprising:

a metal layer (23) along whose surface a surface plasmon wave can be induced by light irradiation; and

a diffraction grating curved surface (25) disposed in the vicinity of said metal layer (23), said diffraction grating curved surface (25) having a diffraction grating with a uniform groove orientation and a uniform groove pitch so as to generate an evanescent wave upon light irradiation;

wherein said diffraction grating curved surface (25) has a curved surface form in a convex shape whose light-irradiated side bulges out, and is disposed so as to be perpendicular to a specific plane (S1), which is perpendicular to a predetermined reference plane (S0), and the diffraction grating is formed in such a manner that the groove orientation is perpendicular to the specific plane (S1).

72. (Cancel) A surface plasmon resonance sensor chip comprising:

a metal layer (233) and a diffraction grating (235) formed in the vicinity of a sensor surface, which comes in contact with a sample; and

a resonance area (238a-238d), formed on the sensor surface (231a), for causing a resonance phenomenon of a surface plasmon wave, which is induced along the surface of said metal layer (233), and an evanescent wave, which is generated by the action of the diffraction grating, upon light irradiation;

wherein said resonance area (238a-238d) has a plurality of continuous areas (238a-238d) discretely formed on the sensor surface (231a), and at least one continuous area (238a-238d) among the plural continuous areas (238a-238d) has a diffraction grating whose at least one of the groove pitch and the groove orientation is different from those of the remaining continuous areas (238a-238d).

73. (Cancel) A surface plasmon resonance sensor chip comprising:

a metal layer (233) and a diffraction grating (235) formed in the vicinity of a sensor surface, which comes in contact with a sample; and

a resonance area , formed on the sensor surface, for causing a resonance phenomenon of a surface plasmon wave, which is induced along the surface of said metal layer (233), and an evanescent wave, which is generated by the action of the diffraction grating, upon light irradiation;

wherein said resonance area is formed continuously on the sensor surface, and the groove orientations of the diffraction grating (225) are uniform while the groove pitches of the diffraction grating (225) have a continuous or discontinuous distribution.

74. (New) A surface plasmon resonance sensor chip as defined in claim 38, wherein at least one of said diffraction grating surfaces (251-254) has a minimum width with one groove alone.

75. (New) A surface plasmon resonance sensor chip as defined in claim 38, wherein

each said diffraction grating surface (251-254) is formed along a sensor surface (201a), which comes in contact with a sample, and

on the sensor surface (201a), a binding substance (206) that binds specifically to a target species in the sample is immobilized for each said diffraction grating surface (251-254).

76. (New) A surface plasmon resonance sensor chip as defined in claim 74, wherein

each said diffraction grating surface (251-254) is formed along a sensor surface, which comes in contact with a sample, and

on the sensor surface, a binding substance (206) that binds specifically to a target species in the sample is immobilized for each said diffraction grating surface (251-254).

77. (New) A surface plasmon resonance sensor chip as defined in claim 75, wherein two or more kinds of binding substances (206, 207) are immobilized for each said diffraction grating surface (251-254).

78. (New) A surface plasmon resonance sensor chip as defined in claim 75, further comprising a plurality of non-diffraction surfaces (251x-254x), each of which does not have any diffraction grating,

wherein each of said non-diffraction surfaces (251x-254x) is disposed along the sensor surface (261a) in the same plane with the respective one of said diffraction grating surfaces (251-254).

79. (New) A surface plasmon resonance sensor chip as defined in claim 75, wherein each said diffraction grating surface (251-254) has a reaction area, within which the binding substance (206) is immobilized, and a non-reaction area, within which a substance (291) that does not bind specifically to any target species in the sample is immobilized or, alternatively, any substance is not immobilized.

80. (New) A surface plasmon resonance sensor chip as defined in claim 75, wherein

said diffraction grating surfaces (251-254) are arranged in a direction perpendicular to the groove orientation, and

said sensor chip further comprises

a cover (286) for covering the sensor surface (281a), and

a plurality of flow channels (280) formed side by side between the sensor surface (281a) and said cover (286) so as to pass along the direction in which said diffraction grating surfaces (281a) are arranged.

81. (New) A surface plasmon resonance sensor chip as defined in claim 75,-wherein:

said diffraction grating surfaces (251-254) are arranged in a direction perpendicular to the groove orientation;

said sensor chip further comprises

a cover (286) for covering the sensor surface (281a), and

a plurality of flow channels (280) formed side by side between the sensor surface (281a) and said cover (286) so as to pass along the direction in which said diffraction grating surfaces (251-254) are arranged; and

along each of said flow channels (280), each said diffraction grating surface (251-254) has a reaction area, within which the binding substance (206) is immobilized, and a non-reaction area, within which a substance (291) that does not bind specifically to any target species in the sample is immobilized or, alternatively, any substance is not immobilized.

82. (New) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 75, comprising the steps of:

making the sample in contact with the sensor surface (201a) while irradiating the sensor surface (201a) with light at a predetermined incident angle;

receiving the light reflected from the sensor surface (201a) and measuring the intensity of the light reflected by each said diffraction grating surface;

identifying a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the measured intensity of the reflected light due to each said diffraction grating surface (201a); and

quantitatively and/or qualitatively analyzing the sample based on the identified groove pitch.

83. (New) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 78, comprising the steps of:

making the sample in contact with the sensor surface while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

correcting the intensity of the reflected light due to each said diffraction grating surface (251-254) with consideration given to the intensity of the light reflected by the respective non-diffraction surface (251x-254x);

identifying a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the corrected intensity of the reflected light due to each said diffraction grating surface (251-254); and

quantitatively and/or qualitatively analyzing the sample based on the identified groove pitch.

84. (New) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 79, comprising the steps of:

making the sample in contact with the sensor surface while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

identifying, for each of the reaction area and the non-reaction area, a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the measured intensity of the reflected light due to each said diffraction grating surface (251-254); and

quantitatively and/or qualitatively analyzing the sample based on the groove pitch identified for each of the reaction area and the non-reaction area.

85. (New) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 80, comprising the steps of:

assigning a plurality of different samples to said plural flow channels (280), respectively, and letting each of the samples flow through the respective flow channel (280) while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

identifying, for each said flow channel (280), a groove pitch at which the resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the measured intensity of the reflected light due to each said diffraction grating surface (251-254); and

quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the groove pitch identified for each said flow channel (280).

86. (New) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 81, comprising the steps of:

assigning a plurality of different samples to said plural flow channels (280), respectively, and letting each of the samples flow through the respective flow channel (280) while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

identifying, for each said flow channel (280) and for each of the reaction area and the non-reaction area, a groove pitch at which the resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the measured intensity of the reflected light due to each said diffraction grating surface (251-254); and

quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the groove pitch identified for each said flow channel (280) and for each of the reaction area and the non-reaction area.

87. (New) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 75, comprising the steps of:

making the sample in contact with the sensor surface (201a) while irradiating the sensor surface (201a) with light at a predetermined incident angle;

receiving the light reflected from the sensor surface (201a) and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

determining the variation between the measured intensity of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface (201a); and selecting a diffraction grating surface (251-254) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected diffraction grating surface (251-254).

88. (New) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 78, comprising the steps of:

making the sample in contact with the sensor surface while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

correcting the intensity of the reflected light due to each said diffraction grating surface (251-254) with consideration given to the intensity of the light reflected by the respective non-diffraction surface (251x-254x);

determining the variation between the corrected intensity of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface; and

selecting a diffraction grating surface (251-254) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected diffraction grating surface.

89. (New) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 79, comprising the steps of:

making the sample in contact with the sensor surface while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

determining, for each of the reaction area and the non-reaction area, the variation between the measured intensity of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface; and

selecting, for each of the reaction area and the non-reaction area, a diffraction grating surface (251-254) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected reaction area and the variation of the reflected-light intensity of the selected non-reaction area.

90. (New) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 80, comprising the steps of:

assigning a plurality of different samples to said plural flow channels (280), respectively, and letting each of the samples flow through the respective flow channel (280) while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

determining the variation between the measured intensity of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample does not flow through each said flow channel (280); and

selecting, for each said flow channel (280), a diffraction grating surface (251-254) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the variation of the reflected-light intensity of the selected diffraction grating surface (251-254) for each said flow channel (280).

91. (New) A method of quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 81, comprising the steps of:

assigning a plurality of different samples to said plural flow channels (280), respectively, and letting each of the samples flow through the respective flow channel (280) while irradiating the sensor surface with light at a predetermined incident angle;

receiving the light reflected from the sensor surface and measuring the intensity of the light reflected by each said diffraction grating surface (251-254);

determining, for each of the reaction area and the non-reaction area, the variation between the measured intensity of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample does not flow through each said flow channel (280); and

selecting, for each of the flow channels (280) and for each of the reaction area and the non-reaction area, a diffraction grating surface (251-254) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the variation of the reflected-light intensity of the selected reaction area and the variation of the reflected-light intensity of the selected non-reaction area.

92. (New) A method as defined in claim 82, wherein it further comprises the step of separating the sample by physical and/or chemical action prior to introducing the sample to the surface plasmon resonance sensor chip.

93. (New) A method as defined in claim 92, wherein in said step of separating, the sample is separated by a separation technique using at least one of liquid chromatography, HPLC (high performance liquid chromatography), capillary electrophoresis, microchip electrophoresis, flow injection, and microchannel.

94. (New) A method as defined in claim 82, wherein

the target species is a light-emitting substance,

said method further comprises the step of detecting the light emitted from the light-emitting substance that is bound to the binding substance prior to light-irradiating the sensor surface or, alternatively, after light-irradiating the sensor surface and receiving the reflected light, and

in said step of quantitatively and/or qualitatively analyzing, the sample is analyzed with consideration given to the detection result of the light emission.

95. (New) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 75, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface (201a) being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface (201a) with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213); and

analyzing means (214) for identifying a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254), and for quantitatively and/or qualitatively analyzing the sample based on the identified groove pitch.

96. (New) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 78, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

correcting means (214) for correcting the intensity of the reflected light due to each said diffraction grating surface (251-254) with consideration given to the intensity of the reflected light due to the respective non-diffraction surface (251x-254x); and

analyzing means (214) for identifying a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the intensity, corrected by said correcting means (214), of the reflected light due to each said diffraction grating surface (251-254), and for quantitatively and/or qualitatively analyzing the sample based on the identified groove pitch.

97. (New) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 79, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213); and

analyzing means (214) for identifying, for each of the reaction area and the non-reaction area, a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254), and for quantitatively and/or qualitatively analyzing the sample based on the groove pitch identified for each of the reaction area and the non-reaction area.

98. (New) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 80, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip;

sample introducing means (282) for assigning a plurality of different samples to said plural flow channels (280), respectively, and for introducing each of the plural samples into the respective flow channel (280) in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where each sample is introduced into the respective flow channel (282) by said sample introducing means (282);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213); and

analyzing means for identifying, for each said flow channel (280), a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254), and for quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the groove pitch identified for each said flow channel (280).

99. (New) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 81, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip;

sample introducing means (282) for assigning a plurality of different samples to said plural flow channels (280), respectively, and for introducing each sample into the respective flow channel (280) in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where each sample is introduced into the respective flow channel (280) by said sample introducing means (282);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213); and

analyzing means for identifying, for each said flow channel (280) and for each of the reaction area and the non-reaction area, a groove pitch at which a resonance phenomenon of the evanescent wave and the surface plasmon wave occurs, based on the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254), and for quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the groove pitches of the reaction area and the non-reaction area identified for each said flow channel (280).

100. (New) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 75, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface (201a) being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

determining means (214) for determining the variation between the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface (201a); and

analyzing means (214) for selecting a diffraction grating surface (251-254) whose variation, determined by said determining means (214), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected diffraction grating surface (251-254).

101. (New) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 78, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

correcting means (214) for correcting the intensity of the reflected light due to each said diffraction grating surface

(251-254) with consideration given to the intensity of the reflected light due to the respective non-diffraction surface (251x-254x);

determining means (214) for determining the variation between the intensity, corrected by said correcting means (214), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface; and

analyzing means (214) for selecting a diffraction grating surface (251-254) whose variation, determined by said determining means (214), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected diffraction grating surface (251-254).

102. (New) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 79, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip with the sensor surface being in contact with the sample;

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

determining means (214) for determining, for each of the reaction area and the non-reaction area, the variation between the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample is not in contact with the sensor surface; and

analyzing means (214) for selecting, for each of the reaction area and the non-reaction area, a diffraction grating surface (251-254) whose determined variation of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing the sample based on the variation of the reflected-light intensity of the selected reaction area and the variation of the reflected-light intensity of the selected non-reaction area.

103. (New) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 80, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip;

sample introducing means (282) for assigning a plurality of different samples to said plural flow channels (280), respectively, and for introducing each of the plural samples into the respective flow channel (280) in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where each sample is introduced into the respective flow channel (280) by said sample introducing means (282);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

determining means (214) for determining the variation between the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample does not flow through each said flow channel (280); and

analyzing means for selecting, for each said flow channel (280), a diffraction grating surface (251-254) whose variation, determined by said determining means (214), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280) based on the variation of the reflected-light intensity of the diffraction grating surface (251-254) selected for each said flow channel (280).

104. (New) An apparatus for quantitatively and/or qualitatively analyzing a sample using a surface plasmon resonance sensor chip as defined in claim 81, comprising:

holding means (211) for holding the surface plasmon resonance sensor chip;

sample introducing means (282) for assigning a plurality of different samples to said plural flow channels (280), respectively, and for introducing each of the plural samples into the respective flow channel (280) in a state where the surface plasmon resonance sensor chip is held by said holding means (211);

light irradiating means (212) for irradiating the sensor surface with light from a predetermined direction in a state where each sample is introduced into the respective flow channel (280) by said sample introducing means (282);

light receiving means (213) for receiving the light reflected from the sensor surface;

measuring means (213) for measuring the intensity of the light reflected by each said diffraction grating surface (251-254) and received by said light receiving means (213);

determining means (214) for determining, for each of the reaction area and the non-reaction area, the variation between the intensity, measured by said measuring means (213), of the reflected light due to each said diffraction grating surface (251-254) and the intensity of the light reflected when any sample does not flow through each said flow channel (213); and

analyzing means (214) for selecting, for each said flow channel (280) and for each of the reaction area and the non-reaction area, a diffraction grating surface (251-254) whose variation, determined by said determining means (214), of the reflected-light intensity is within a predetermined allowable range for determination, and for quantitatively and/or qualitatively analyzing each sample flowing through the respective flow channel (280), based on the variation of the reflected-light intensity of the selected reaction area and the variation of the reflected-light intensity of the selected non-reaction area for each said flow channel (280).

105. (New) An apparatus as defined in claim 95, wherein it further comprises sample separating means (292) for separating the sample by physical and/or chemical action prior to introducing the sample to the surface plasmon resonance sensor chip.

106. (New) An apparatus as defined in claim 105, wherein said sample separating means (292) is operable to separate the sample by a separation technique using at least one of liquid chromatography, HPLC (high performance liquid chromatography), capillary electrophoresis, microchip electrophoresis, flow injection, and microchannel.

107. (New) An apparatus as defined in claim 95, wherein
the target species is a light-emitting substance,

said light receiving means (213) is operable to detect the light emitted from the light-emitting substance that is bound to the binding substance, and

said analyzing means (214) is operable to quantitatively and/or qualitatively analyze the sample with consideration given to the detection result of the light emission by said light receiving means (213).

108. (New) A surface plasmon resonance sensor chip comprising:

a metal layer (23) along whose surface a surface plasmon wave can be induced by light irradiation; and

a diffraction grating curved surface (25) disposed in the vicinity of said metal layer (23), said diffraction grating curved surface (25) having a diffraction grating with a uniform groove orientation and a uniform groove pitch so as to generate an evanescent wave upon light irradiation;

wherein said diffraction grating curved surface (25) has a curved surface form in a convex shape whose light-irradiated side bulges out, and is disposed so as to be perpendicular to a specific plane (S1), which is perpendicular to a predetermined reference plane (S0), and the diffraction grating is formed in such a manner that the groove orientation is perpendicular to the specific plane (S1).

109. (New) A surface plasmon resonance sensor chip comprising:

a metal layer (233) and a diffraction grating (235) formed in the vicinity of a sensor surface, which comes in contact with a sample; and

a resonance area (238a-238d), formed on the sensor surface (231a), for causing a resonance phenomenon of a surface plasmon wave, which is induced along the surface of said metal layer (233), and an evanescent wave, which is generated by the action of the diffraction grating, upon light irradiation;

wherein said resonance area (238a-238d) has a plurality of continuous areas (238a-238d) discretely formed on the sensor surface (231a) disposed on a same plane or a same plane partially having a gently curved surface, and each of said continuous areas (238a-238d) has a uniform groove orientation and a uniform groove pitch, and at least one continuous area (238a-238d) among the plural continuous areas (238a-238d) has a diffraction grating whose groove orientation is different from the groove orientation of the remaining continuous areas (238a-238d).

110. (New) A surface plasmon resonance sensor chip as defined in claim 109, wherein at least one of said continuous areas (238a-238d) has a minimum width with one groove alone.